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ABSTRACT

This directory is designed to address the need for technology planning in the curriculum, as well as to provide information about the distance education technology options available for school districts in the Northwest states of Alaska, Idaho, Montana, Oregon, and Washington. The following areas are covered: satellite television, two-way audio; satellite television only; broadcast and cable television; computers; telecommunications; other distance education assistance; information resources; and a curricular cross-reference. Each section contains descriptions of the services with a contact name and address. Information about planning, decisionmaking, and evaluation as well as a glossary of terms are appended. (JLB)

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THE Northwest Regional Educational Laboratory

TECHNOLOGY PROGRAM

ED 369 386

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DISTANCE EDUCATION RESOURCE DIRECTORY FOR NORTHWEST SCHOOLS

Donald C. Holznagel

March 15, 1994

BEST COPY AVAILABLE

Northwest Regional Educational Laboratory
101 S.W. Main, Suite 500
Portland, Oregon 97204

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INTRODUCTION

Through the periodic regional needs assessments by the Northwest Regional Educational Laboratory (NWREL), many small rural school districts expressed interest in using technology to assist in solving the problems typical in small schools of lack of subject offerings in critical areas such as foreign languages and advanced math and science, and needs for staff development offerings in a convenient location. The Distance Education and Telecommunications Advisory Committee of the NWREL has recommended the development of this Directory as a means of addressing the problems of lack of information and planning assistance which can be a barrier to small schools in planning for the use of technology for curricular improvement.

The Directory has been designed to address two needs. First, there is a need to plan for technology in the curriculum. Many districts are developing long-range plans to ensure that options are examined in the light of curricular needs and that the costs are fully explored and projected. This requires not only identifying options but also their implications for staff, organization, and other factors.

A second need is for up-to-date information about the options. If a district is considering using distance education technologies, staff will need to identify the available systems, select the options appropriate to their needs, and contact representatives of the organizations providing the service.

The information in this Directory is current as of March 15, 1994. Because the field of telecommunications is constantly changing, and details of course offerings and costs from distance education producers changes at least yearly, a revision will be issued periodically. Information is included here which is most relevant to school districts in the Northwest states of Alaska, Idaho, Montana, Oregon, and Washington. Readers outside of the area will find options included which are not available to them, and might in turn have access to services not included here.

For information about services and options within a state, and about laws or regulations regarding staffing, usage, costs or other state-governed issues, please contact the appropriate state representative from the following list. They are all knowledgeable in distance education, telecommunications, computers, and other instructional technologies. For general questions, planning assistance, and other technical assistance, you may also call the author.

Alaska	Lois Stiegemeier	907/465-8724
Idaho	Ken Reed	208/334-3561
Montana	Scott Buswell	406/444-4326
Oregon	Kathryn Hansen	503/378-8004
Washington	Cheryl Lemke	206/753-2574
NWREL	Don Holznagel	503/275-9624

Satellite Television, Two-way Audio

This section describes organizations which produce complete courses or units of instruction in a variety of subjects and levels for students, and staff development courses or teleconferences for teachers. They all use live television delivered by satellite as a presentation medium supplemented by telephone for interaction between students and teachers, commonly called one-way video, two-way audio. Equipment can be acquired locally or through the delivering organization, and includes a satellite antenna, cabling to the classroom, receiving equipment, signal decoder, monitor, and phone line in the receiving classroom. Not all of the services are available in all states in the region. Subjects and topics may vary somewhat from year to year depending on demand, teacher availability, and the priorities of subscribers or governing boards.

Students must be enrolled in a course as they would in a school. Class sizes and process of student-teacher interaction vary, and class sessions are conducted on different patterns of three, four, or five days a week. A local school staff person, called a facilitator or monitor, is required. The person carries out tasks such as registration, attendance, discipline, test supervision, and liaison with the delivering organization. Some states require that the facilitator be a certified teacher, although not in the subject of the course being supervised, while in other states an instructional aide may be used. Schools are expected to have students participate in the live class sessions rather than by viewing videotape. In some cases, computer programs supplement classwork.

ASTS—Arts and Sciences Teleconferencing Service

Oklahoma State University
401 Life Sciences East
Stillwater, OK 74078-0276 Phone: 1-800/452-2787

Access: C-band, Galaxy VI and Ch. 23

Costs:

1-3 students $725 each per course per year
4-10 students $3,000 total for all
Computer software and instructional materials extra

Student Enrichment: $150 per program live, $250 videotape

Courses:

German I, II, and III
AP Physics, AP Calculus
Getting Ready for the PSAT/NMSQT and SAT.

Schedule: Live-course sessions are conducted two or three days per week in the morning, with planned work in computer-based material, audio tapes, print material, or tests on the other days.

Instructors: Professors are selected from the staff of Oklahoma State University.

ESP–Educational Systems Programming

Educational Systems Programming
Northern Arizona University
P.O. Box 5751 Phone: 1-800/628-6266
Flagstaff, AZ 86011-5751 FAX: 1-600/523-7647

Access: C-band satellite or schools may elect to use videotape. Interactive instructional software is provided, using Macintosh. Toll-free telephone call-in at scheduled times is used for student-teacher interaction. Preview video available.

Cost: The Foreign Languages Initiative is $100.00 per school plus $20.00 per student. The videotape option is available at $400.00 per program level per school.

Courses: The Foreign Languages Initiative for 1994-95 includes Spanish for grades 1-2, 3-4, and 5-6. The programs will be delivered in live sessions of about 25 minutes each, twice a week. Curriculum is essential-skills based, with an emphasis on the communicative approach.

IREDS SatNet

Rich Mincer
Idaho State Department of Education
Len B. Jordan Office Building
Boise, ID 83720 Phone: 208/334-3561

Access: Any school in Idaho can have access. The system is a network of satellite downlinks at over 100 schools across Idaho and several cable companies. The Idaho Cable Television Association has assisted in the distribution over local access cable. Through TCI, programming is distributed on local access channels in six large population centers in the state. Programs are available on Telstar 302 (T2), channel 22. (There is a possibility of moving to satellite F1 next year.) Schools outside Idaho

which can access the signal may use the programming, but the content is specific to Idaho needs and context.

Costs: There are no subscription or usage fees.

Courses: Programming is primarily inservice training for teachers and school administrators. A wide variety of topics is addressed, including the use of technology, specific systems such as Learning Link, curricular methods in reading and math, early childhood education, education legislation, and others. Offerings may expand next year.

LiveNet

Dr. Carl O. Ellis
Associate Dean
College of Community and Continuing Education
University of Alaska—Anchorage
Building K, Room 122
3211 Providence Drive
Anchorage, AK 99508 Phone: 907/786-1379

Access: Contact Dr. Ellis. The service is designed to present courses for CEU, Carnegie, or university credit. Broadcasts are by low-power satellite to South Central and Southeast Alaska, primarily to military bases. A special arrangement has been made for the North Slope Borough School District to use the system for its secondary instruction.

Costs: Contact Dr. Ellis. All applications on the system are self-supporting.

Courses: Several departments of UAA present degree programs. Staff development courses of the State Department of Education will be available, and courses leading to certain master's degrees in Education such as Special Education. The North Slope Borough School District is using the system to send high school math courses to ten sites in the district. Access must be negotiated with Dr. Ellis.

MCET

Linda DiRocco, Acting Executive Director
MCET
38 Sidney Street, Suite 300 Phone: 617/621-0290
Cambridge, MA 02139-4135 FAX: 617/621-0291

MCET, the Massachusetts Corporation for Educational Telecommunications, provides academic modules and staff development K-12 in all subject areas to member school districts within the state. It also provides those services by contract to out-of-state

schools and school districts, including those in the Northwest region. Write or phone for programming, rates, and contract package.

Pacific Northwest Star Schools Partnership

Central Office:

Dr. Ted Roscher
ESD 101/Star Schools
East 4022 Broadway
Spokane, WA 99202 Phone: 509/536-2152

State Governance Board and Coordinators:

AK:	Lois Stiegemeier or Donna Ostrowski-Cooley	907/465-8724
ID:	Ken Reed or Rich Mincer	208/334-3561
MT:	Ron Lukenbill or Steve Meredith	406/444-2080
OR:	Wayne Neuberger or Kathryn Hansen	503/378-8004
WA:	Cheryl Lemke or Dick Barnhart	206/753-2574
Ex Officio members:		
Brian Talbott, Superintendent, ESD 101, Spokane, WA		509/456-2715
Dennis Bracey, RXL Communications		206/728-1100

Access: C-band satellite, SatcomC (formerly F1), Ch. 18 and Ch. 16. Access also requires special computer equipment for data transmission. Contact your state representative for application information.

Costs: Major costs of development, training, and pilot sites are supported by a Star Schools grant during the period 1993-94. There are membership and student fees.

Courses: New courses include Environmental Science (High School), Work Place Basic Skills (youth and adults), and Young Astronauts for grades 4-6. Other courses include Applied Math, Middle School Science and Technology, Middle School Career Paths, and Summer Basic Skills. Courses are designed by the Partnership, and produced and transmitted by the STEP organization (see description below).

SERC—Satellite Educational Resources Consortium

Gary Vance
Executive Director
SERC
P.O. Box 50008 Phone: 803/252-2782
Columbia, SC 29250 FAX: 803/252-5320

SERC courses are live, interactive, satellite-delivered instruction with additional interactivity provided through telephone voice contact and computer networking. Both student for-credit courses, middle-school courses and teacher staff development and graduate courses are available. Consortium members are state education agencies and public television networks in 21 states ranging from California to Florida. No states or other agencies in the Northwest region are members at this time; there are no local districts in the region.

Costs: States may be either full or associate members at costs ranging from $10,000 to $35,000. Tuition fees are $490 per student for language courses and $420 for other courses. Students in nonmembers states are eligible to enroll at an increased fee of $650 per course, per year.

Courses: Courses are produced by participating state networks. Courses include Japanese (NE ETV), Russian, Micro-Macro Economics (SCETV); Spanish II (ND PPB), Latin, German I, Physics, Probability and Statistics (KET); Calculus (MS); and Integrated Science for grades 6, 7, 8 (University of AL).

STEP—Satellite Telecommunications Educational Programming

Dr. T.A. (Ted) Roscher
Telecommunications Division Administrator
STEP
East 4022 Broadway
Spokane, WA 99202 Phone: 509/536-0141

Access: C-band satellite, SatCom F1, Ch. 16 and Ch. 18. Courses are television with live telephone contact between teacher and students during class.

Costs:

Membership	$3,000 with inservice, $4,250 without inservice
Inservice	$750 for 10 certified staff; up to $5,750 over 200 certified staff on a graduated scale
1-7 Students	$490 per student per course per year
8-12 Students	$3,900 total
13-20 Students	$4,850 total
21+ Students	$4,850 plus $175 per student beginning with the 21st student on up
Enrichment	$1,000 total

Courses: Japanese, Spanish, Russian, Advanced Senior English. Inservice programs are provided on 15-20 topics in a school year. (See also Pacific Northwest Educational Telecommunications Partnership.) Enrichment programs are on a range of topics for elementary and secondary students.

Schedule: Live class sessions are conducted four days per week, with the fifth day reserved for testing and other local activities. Course schedules vary, and are set annually by a steering committee composed of members. Enrichment programs are four 50-minute sessions on consecutive Fridays. Staff development programs are one to four sessions conducted between 4:00 p.m. and 7:30 p.m., Pacific time.

Instructors: STEP employs teachers certified in Washington state, and who are approved in all states having participating schools.

TI-IN Network Inc.

Corporate Office:

TI-IN Network, a division of Westcott Communications, Inc.
1303 Marsh Lane
Carrollton, TX 75006 Phone: 1-800/978-8446

Representative for Alaska, Oregon, Montana, Idaho, Washington:

Dr. John Erickson
P.O. Box 65451
Port Ludlow, Washington 98365 Phone: 1-800/999-8446, ext. 5426

Access:

Compressed Digital Video
Ku-band satellite
Receive equipment provided to subscribing schools

Costs:

Annual Support and Service (high school)	$4,250
Elementary School	$2,000 (includes two courses and unlimited enrollment)
Per Student per course per semester	$240-$290
Elementary courses	$500 each/unlimited enrollment
Elementary and secondary enrichment	No Charge
Staff development	Included in support and service fee

Courses:

French, German, Spanish, Latin, Japanese
Physics, Astronomy, Marine Science, Anatomy and Physiology, Elementary Spanish, Middle School Language Survey (Latin, French, Spanish, Japanese, Chinese, and German)
Calculus, Literature, Beginning ESL
Environmental Science, Middle School Math, and Science Modules
Psychology, Sociology
(Advanced Placement credit options for Physics, Calculus, Psychology, and Literature)
Staff development programs are offered in over 20 topics in a school year.

Schedule: Live sessions are conducted five days a week between 5:00 a.m. and 2:00 p.m., Pacific time, including secondary, elementary, and enrichment. Staff development is conducted mainly between 1:00 p.m. and 5:00 p.m., Pacific time. Enrichment programs are 25-minute sessions conducted once and targeted at a variety of grade levels. The 1994-95 school year is August 24, 1994 to May 26, 1995.

Instructors: TI-IN employs experienced teachers who are certified, usually in many states.

Triad Project

Ms. Ann McLean
Puget Sound ESD
12320 80th Avenue South
Seattle, WA 98178 Phone: 206/439-6913

Access: Access is available to all school districts in Washington state. Access for schools outside the state is not available now, but future access through the Pacific Northwest Educational Telecommunications Consortium is a possibility. Satellite access information is available from the above office.

Costs: Districts may become members of the Triad Project at a cost of $600.00 for districts having less than 100 teachers, and $900.00 for those having more than 100 teachers.

Courses: Programs are currently for staff development purposes, addressing a variety of topics, and are produced quarterly. Program topics for 1994-95 were not available at the time of this printing, and may be obtained from the above office. Three or four programs are produced per year through the cooperation of the Washington Office of the Superintendent of Public Instruction and the Puget Sound ESD.

NASA—National Aeronautics and Space Administration

Satellite Videoconferences

A series of educational programs for teachers in aeronautics and space science topics is provided each school year. The conferences include an interactive component for viewer questions and discussion.

Videoconference Coordinator
NASA Aerospace Education Services
Oklahoma State University
300 N. Cordell
Stillwater, OK 74078 Phone: 405/744-7015

Satellite Television Only

The following services provide one-way television programming by satellite, with no interaction between receiver and sender. They do not provide full instruction in courses, but offer a variety of material which can be used by teachers to supplement and enrich regular courses in several ways. The television equipment required in the school is the same as for the services in the previous section, but no phone line is needed.

Channel One

Whittle Communications, through its Whittle Educational Network, provides Channel One, a daily 12-minute television news program designed especially for schools and delivered by satellite. In order to receive the program, a school is given the required satellite dish and other video equipment free of charge. Each program contains four 30-second commercials. The Network also offers The Educators' Channel to provide staff development, and The Classroom Channel to provide instructional enrichment programming.

Customer Service
Whittle Educational Network
333 Main Street
Knoxville, TN 37902 Phone: 1-800/445-2619

CNN Newsroom

CNN NEWSROOM is a fifteen-minute, commercial-free, cable or satellite delivered news program offered free of charge to schools. The program airs each weekday at 3:45 AM (ET) on CNN, providing schools with the most up-to-the-minute news coverage from around the world. The Program is copyright free and can be taped and used anytime in the curriculum. A daily classroom guide is available through a variety of electronic mail services including America Online and various state educational networks.

Turner Educational Services, Inc.
One CNN Center
Box 105366
Atlanta, GA 30348-5366 Phone: 1-800/344-6219

NASA Select

NASA Select is the NASA television service. In addition to live coverage of space missions, informational and educational programming on space and related topics is provided including historical documentaries and new scientific information from continuing projects. Programming will occur in four-hour blocks starting at 9:00 a.m.

Pacific time, Monday through Friday, repeated at 1:00 p.m., 5:00 p.m., and 9:00 p.m. Transmission is on SatCom F2R, C-band, transponder 13, 72 deg. W., frequency 3954.5 MHz, Audio 6.8 MHz.

Director, NASA Select
c/o Deputy Associate Administrator for Public Affairs
Code P
NASA Headquarters
Washington, DC 20546

SCOLA

The SCOLA organization provides access by satellite to native language television news programs live or by tape delay. Programs are available from over 30 countries. English translation is also provided. Their OutWrite service provides instructional support materials. Inservice workshops are also offered about once a month.

SCOLA
P.O. Box 619
McClelland, IA 51548-0619

Phone: 712/566-2202
FAX: 712/566-2502

NOAA—National Oceanographic and Atmospheric Administration

A variety of informational publications regarding the use of data from various federal centers is available to teachers. A free computer bulletin board service is available which contains several categories of information about satellite data. The Direct Readout Service provides direct access to transmissions from weather satellites.

NOAA Educational Affairs Office
Suitland & Silver Hill Roads, Rm. 0158
Suitland, MD 20746

Phone: 301/763-4690
NOAA.SAT Bulletin Board:
1-800/546-1000

Broadcast and Cable Television

The services in this section require only standard television receiving systems in the school. No satellite antenna is needed, and in the case of PBS courses, no phone line is required. PBS courses do not have a live interactive component, and therefore may be as easily viewed on videotape as by broadcast.

PBS—Public Broadcasting Service

General information:

Please first consult the Education Services Director of your local PBS station. For the name and phone number of your Education Director, contact:

Thomas J. Flavell
Marketing Associate
K-12 Learning Services
Public Broadcasting Service
1320 Braddock Place
Alexandria, VA 22314

Phone: 703/739-5402
FAX: 703/739-8495
E-mail: tflavell@pbs.org

PBS K-12 Learning Services is the school television arm of PBS dedicated to serving instructional needs of students and teachers nationwide, through and on behalf of public television station and related education agencies. In addition to distributing instructional programming and related curricular materials for K-12 classroom use, it facilitates the use of PBS primetime and children's programming as curricular resources; and supports the station and school use of other PBS Learning Services including *Mathline*, PBS ONLINE, PBS *Learning Link* and PTV, the *Ready to Learn Service* on PBS.

Videoconferences:

Francis Thompson or Tom Flavel

Phone: 703/739-5402
FAX: 703/739-8495
E-mail: tflavell@pbs.org

Access: The PBS K-12 Learning Services provides instructional programming to PBS affiliate stations or state PBS affiliate organizations. Contact your local station or state public broadcasting agency for offerings and schedule. Oregon Public Broadcasting provides a video library arrangement in which all educational programs for classroom use are broadcast between 5:00 and 7:00 a.m. daily specifically for taping by Oregon schools. KCTS-Seattle provides programs to K-12 schools by daily broadcast and video library, teacher inservice, and the PBS *Learning Link* service.

Costs: Varied, but sometimes free to schools if license fees are paid by the station or other sponsor. Videoconference costs are usually passed on to participants in the form of a registration fee.

Courses: Programming is of three types: full courses, instructional supplements, and staff development videoconferences. Full courses in foreign languages, math, and science are developed by the Annenberg/CPB project. Instructional supplements are individual programs or short series intended for classroom use. Staff development videoconferences are single sessions or series developed in conjunction with educational organizations such as ASCD and NCREL, which incorporate periods of live interaction between panelists and viewers.

Schedule: Varied. Contact your local station or state PBS agency. Statewide agencies are:

Idaho Educational Public Broadcasting System	Jerry Garber	208/385-3727
Oregon Public Broadcasting	Steve Johnson	503/293-1909

Cable in the Classroom

General information:

Cable in the Classroom
1900 North Beauregard Street
Suite 108
Alexandria, VA 22311 Phone: 703/845-1400

Access: Through your local cable company. Member channels include A&E, BET, Bravo, C-SPAN, CNBC, CNN, Court TV, The Discovery Channel, ESPN, The Family Channel, The Learning Channel, Lifetime, Mind Extension University, MTV, Nickelodeon, PBS, Sci-Fi Channel, SportsChannel, VISN, The Weather Channel, WGN, and X*PRESS.

Cost: There is no cost for the programming. Member cable companies currently provide a free cable connection for secondary schools. Some instructional support materials are available free of charge; some channels provide materials at a minimal cost.

Courses: All programming is supplementary instructional material except for courses available on Mind Extension University. Many member channels provide classroom kits and study guides to assist teachers in classroom use of the programming. (See *Cable in the Classroom* magazine for contact references.) The organization has arranged with its member channels for blocks of commercial-free educational programming (over 500 hours monthly) which occurs in regular time periods and have liberal copyright clearances.

Computers, Telecommunications

Services presented in this section rely on computers, modems, telecommunications software, phone lines, and electronic mail systems to provide a variety of services, including full-course individualized instruction, organized student group interaction, student-mentor communication, and special bulletin boards or databases. The school site is required to have a phone line in addition to the computer equipment, but no satellite antenna or other television equipment. Ongoing costs include telephone line charges and in some cases subscription fees.

The full course options require student registration and assume completion in a standard time period such as a semester. The organized supplementary instruction options also require registration and the activities are expected to take place within a specified period.

Complete Courses

ACS—Alyeska Central School

"Alaska's Centralized Correspondence School"
Alaska Department of Education
3141 Channel Drive, No. 100
Juneau, AK 99801-7899 Phone: 907/465-2835

Access: Enrollment is by individual student, although a group of students in a school may take the same course at the same time. Enrollment is available only to Alaska residents. Course materials are sent by regular mail. Access is provided to the UACN electronic mail system for timely student-teacher contact. Courses are being rewritten to incorporate electronic mail as a standard tool. Periodic telephone conference calls are used during a course for group interaction involving all students whether at home or in school.

Costs: There is no cost to individual Alaska residents. Charges are made for course materials and e-mail usage when districts purchase courses.

Courses: A full range of courses in the Alaska secondary and elementary curriculum is available, including sciences, mathematics, social studies, language arts, and others.

Schedule: Students are enrolled on a semester or school year basis and are expected to complete a course within a standard period of time.

Instructors: Certified teachers are employed in ACS to develop courses and act as the teachers of courses in progress, receiving student work and tests and providing guidance.

EDUNET

EDUNET
P.O. Box 298
Saco, MT 59261

Phone: 406/527-3531
Computer phone: 406/527-3521

Access: The system is based on electronic mail and file transfer. The receiving site needs a microcomputer with printer, modem, and a telecommunications software package, and uses ordinary phone lines to reach the central computer. The computer system is "open-access." By connecting with the above computer phone number a new user may select a personal password, answer a few questions, and immediately become part of the system.

Costs: $250 per student per course per semester, staff development same rate. Cost of long distance calls not included.

Courses: Approximately 68 courses are available, representing a wide range of curricular areas including math, science, foreign languages, business, and others. Courses are designed as individualized instruction. Student instructions and course materials are stored in computer files which are downloaded to the school microcomputer when requested. Student-teacher interaction is primarily by electronic mail, although telephone conversations can take place when teachers are available.

Schedule: Courses generally follow the school calendar (18-20 week semesters). Courses are designed for individualized, self-paced instruction, although completion is expected to coincide with the end of the school semester. Course offerings in a given semester depend on the demand and available teachers.

Instructors: Teachers certified in the subject area of the course are allowed to design, develop, and teach a course. A course may be taught by a teacher who did not develop the course. Development consists of the design of lessons and development or selection of instructional materials. Teaching consists of guiding students through the completion of a course, checking and grading work, and responding to student questions and discussion.

Supplementary Instruction

AT&T Learning Network

The AT&T Learning Network is a curriculum-based telecommunications service which provides team-based collaborative project development for students and their distant peers. Classes of geographic, cultural, and social diversity are linked together to share ideas, projects, histories, cultures, and perspectives. Fees range from $195 to $375 per session depending on length, and include instructional materials and telecommunications software.

AT&T Learning Network
P.O. Box 6391
Parsippany, NJ 07054 Phone: 1-800/367-7225, ext. 4158

NASA Telelectures

The Virginia Air and Space Center supplies a live audio lecture and discussion by telephone supported by 35mm slides at the receiving site. After a reservation is made, a slide carousel is sent to the local sponsor (school or organization) to be shown in combination with the live phone presentation. Eleven programs, relating to NASA topics in aerospace research, are available. The only cost is for return mailing of the slide carousel. Adherence to a precise schedule is important at the receiving site.

Telelecture Programs
Virginia Air and Space Center
600 Settlers Landing Road Phone: 804/727-0900
Hampton, VA 23669-4033 FAX: 804/727-0898

NGS Kids Network

The National Geographic Society offers this program to provide elementary and middle school student research activities organized around topics in science and social studies. Seven eight-week units are available. Students engage in local research, then compare data, hypotheses, and conclusions with students in other parts of the country and other countries who are involved in the same investigation at the same time. Materials are $325 to $375 per unit, plus $115 for tuition and telecommunications. Available for Apple IIGS, Macintosh, and IBM computers.

National Geographic Society
Educational Services
Washington, D.C. 20036 Phone: 1-800/368-2728

WorldClassroom

WorldClassroom is an international curriculum and information network for K-12 schools worldwide. Classes are linked with their peers from distant locations and work on structured curriculum activities in science, social studies, language arts, foreign languages, and current events. Students get involved in data sharing, problem-solving, and writing activities. In addition to these activities, Guest Speakers are online to discuss topics of interest to teachers and students alike. A subscription fee is a site license that gives the school access to all online activities and all other subscribing schools worldwide. WorldClassroom is available via the Internet as well as toll-free and local access numbers. Costs vary from $195 to $595 based on type of access and length of subscription.

Global Learning Corporation
P.O. Box 201361
Arlington, TX 76006

Phone: 1-800/866-4452
FAX: 1-817/460-5483
E-mail: global @glc.dallas.tx.us

Databases, Bulletin Boards, and Networks

Big Sky Telegraph

Big Sky Telegraph (BST) is an educationally-focused community network supportive of K-100 lifelong learning. BST offers free access and free online lessons to anyone, anywhere, anytime, showcasing highest value resources from the Internet. BST will customize its services to support grassroots innovations and projects initiated by its members. Resource-sharing partnerships are continuously invited. Internet mail accounts are available for $50 per year. Full Internet services will soon be available. BST's "Reach for the Sky" science and math telecomputing project is funded by the Annenberg/CPB Science and Math project and the US West Foundation.

Frank Odasz
Big Sky Telegraph
Western Montana College
710 S. Atlantic
Dillon, MT 59725

Phone: 406/683-7338
FAX: 406/683-7493
Computer: 406/683-7680
E-mail: franko@bigsky.dillon.mt.us

Computer PALS Across the World

A global sharing electronic network which aims to familiarize students and community institutions in the use of worldwide communications (including fax, phototelephone, and electronic mail.) Coordinated by primary-tertiary educator volunteers, the network operates through existing systems (Internet, Internet-accessed services, BTNA/Campus 2000, etc.) Current projects include: environment/energy, newsday activities, cross-curricular projects, school matches, letters to Moscow, personal

relationships, etc. Membership fees are set at $50/12 months with online charges dependent upon system used and group availability.

Virginia Warner, USA Director
Computer Pals Across the World, Inc.
P.O. Box 2332
Carson City, NV 89702

Phone: 702/885-1907
FAX: 702/885-1907
E-mail: vwarner@unr.edu

FrEdMail

FrEdMail is a network composed of many local electronic mail and bulletin board systems which operate independently during the day and transfer files between sites at night. The major goal is to motivate writing and communication skills. Students may do their writing offline, and the collected writings of a group may be shared with another group in another part of the country by transmitting batches at night. Participating through an existing local node is free. There is a cost of $149 for the software to establish a local system to serve up to 200 users and $199 annual FrEdMail Consortium subscription fee. The newsletter has an annual subscription fee of $10, and handbooks and training materials are available at low cost.

FrEdMail Foundation
Box 243
Bonita, CA 91908-0243

Phone: 619/475-4852

K12 Net

K12Net: the grassroots school network with "training wheels!"
K12Net is a cooperative network of approximately 500 autonomous school-based or -oriented FIDOnet BBS's throughout the world as well as a similar number of Internet-based USEnet sites. There are, for example, nearly 60 K12Net BBS's in New Zealand alone. They all share three dozen common conferences directly relating to K-12 curriculum areas and classroom projects. A message written in any of these conferences is "echoed" to all of the other K12Net sites around the world where teachers, students or parents may read and respond to them. Access is open to the public, is free of charge and there are no network affiliation fees of any kind. Schools wishing to set up their own K12Net BBS will find start-up costs to be remarkably low and technical assistance from the FIDOnet community readily available.

Information contacts:

Jack C. Crawford, Jr.
Wayne-Finger Lakes Teacher Resource Center
703 E. Maple, 10 Eisenhower Hall
Newark, NY 14513-1863

Phone: 315/331-1584
Fax: 315/331-1587
FIDOnet: 1:260/620
E-mail: jack@rochgte.fidonet.org

OR

Janet Murray
Wilson High School
1151 S.W. 25th Avenue
Portland, OR 97219

Phone: 503/280-5280, Ext. 450
FIDOnet: 1:105/23
E-mail: jmurray@peg.com

LabNet2: The High School Science Teachers' Network

Building on the original three-year project, LabNet2 is committed to supporting the spread of project-enhanced science learning (PESL) by helping teachers to create learning environments in which students can experience the excitement of the working scientist. Central to this effort is the nationwide telecommunication LabNetwork which facilitates teacher support and the exchange of ideas. Over the next several years, LabNet2 will expand this network, adding 1,350 high school science teachers. Applications are currently being accepted; for more information, write or call the address below. The LabNet project is administered by TERC, a nonprofit education research and development organization, and is funded by the National Science Foundation.

LabNet2
TERC
2067 Massachusetts Avenue
Cambridge, MA 02140

Phone 617/547-0430

NASA Spacelink

NASA Spacelink is a computer information system for teachers and students. The Spacelink database includes current news about NASA missions and programs as well as information resources about NASA programs in aeronautics, space exploration, space flight, and Mission to Planet Earth. Information about NASA education services, classroom materials, and software is also included. Spacelink is available via modem at 205/895-0028 or through the Internet at spacelink.msfc.nasa.gov.

Additional information may be obtained from:

Flint Wild
Spacelink System Administrator
Marshall Space Flight Center
Mail Code CA-21 Phone: 205/544-6360
Huntsville, AL 35812 Computer System: 205/895-0028

NOAA—National Oceanographic and Atmospheric Administration

A variety of informational publications regarding the use of data from various federal centers is available to teachers. A free computer bulletin board service is available which contains several categories of information about satellite data. The Direct Readout Service provides direct access to transmissions from weather satellites.

NOAA Educational Affairs Office Phone: 301/763-4690
Suitland & Silver Hill Roads, Rm. 0158 NOAA.SAT Bulletin Board:
Suitland, MD 20746 1-800/546-1000

Ostendorf On-Line

This is a service of the publisher of *At A Distance* described in a later section. It is an online database of distance education program scheduling which is updated daily, and is designed to supplement the printed catalogs with highly current information. It is provided through the Learning Link and Intro Link systems described in this section. Special arrangements for access at reduced rates have been provided to schools in the Northwest states because of a joint development effort. Contact your state technology coordinator for details of access in your state.

PSInet

The People Sharing Information Network (PSInet) is the name of software designed for conducting conferences by telecommunications using IBM-compatible microcomputers. A network host system may be established by anyone. Participants at each station can do most of their work offline, and files are sent to and received from the host system (also a microcomputer) in batches for speed and economy. In addition to messages between members, the system handles sessions and papers in a conference format. Messages and conferences may also be exchanged between PSInet networks. Standard telephone service is used for all connections. Major groups of users have been formed by the National Education Association and the Council of State Science Supervisors. Many science supervisors are forming teacher networks within their states. Software for either a host station or a user work station may be purchased from IBM Corporation.

For further information, contact the IBM Educational Representative for your area. Science teachers should also contact their state science supervisor.

X*PRESS/X*Change

X*PRESS Information Services Ltd. provides information services through cable television lines to schools and homes through a service called X*Change. Online access is provided to newswire services from several countries including the Soviet Union, Germany, and Japan, and to other services such as Standard and Poor's stock quotes. A conferencing service enables students and teachers to communicate with others across the country on topics of importance to them.

X*PRESS Information Services Ltd.
4700 S. Syracuse, Suite 1050
Denver, CO 80237 Phone: 1-800/7PC-NEWS

OTHER DISTANCE EDUCATION ASSISTANCE

ESN—Education Satellite Network

ESN is a school district service developed and operated by the Missouri School Boards Association. It provides equipment, technical assistance, and programming in a package to assist school districts with access to distance education services from a variety of sources. Outside Missouri, services are provided through an agreement with state school boards associations. In the Northwest, the Idaho and Montana associations have such agreements. Districts in those states may use the following contacts to investigate the service:

Idaho:	Vicki Weber, ISBA	208/342-6411
Montana:	Bob Anderson, MSBA	406/442-2180

ESN charges a membership fee which supports its services, some of which are listed below. They are packaged in various combinations at different cost levels.

Hardware—antenna and related equipment, and in-school video and telephone equipment.

Monthly Program Guide—describes programming and schedules.

Enrichment Programs—ESN licenses viewing and taping rights for programming from a dozen vendors including SCOLA, Classroom Earth, and others.

Inservice—staff development programs and teleconferences are produced by ESN and other agencies.

Instructional Programming—ESN will assist districts in arranging contracts with major course producers such as Oklahoma State University, but does not pay the fees.

State Telecommunications Networks

The states of Montana and Oregon are developing statewide networks which will ultimately be capable of providing a wide range of services including television and data transmission. In both states, some services began in 1990-91 and are being developed over a period of three to five years. Elementary and secondary school services are being coordinated with the state education agencies. (The Oregon Department of Education will sponsor courses in Marine Science for high schools and middle schools on ED-NET.) Districts in those states may contact the following:

Montana:	METNET, Scott Buswell	406/444-4326
Oregon:	ED-NET, Christie Leonhardt	503/293-1998
Idaho:	Learning Link, Rich Mincer	208/334-2166

State Technology Coordinators

Each of the state education departments in the Northwest has staff who are assigned responsibilities for aspects of distance education and telecommunications, including providing information and assistance to districts. They are the same state representatives listed in the introduction of this booklet.

Private Companies

Frequently, corporations are willing to provide assistance to school districts in areas of their expertise. School district personnel probably know of companies in their local area which have knowledge in telecommunications, such as the telephone, cable television, and broadcast television companies. Described in this section are organizations whose work covers a wide area of the region, and whose staff are available for planning services or other assistance, usually in relation to extending their business.

U. S. West Communications

This company provides telecommunications services in 14 western states, and has a central staff dedicated to planning and marketing distance education systems and services. They are particularly interested in two-way interactive video and audio systems, implemented in a locally controlled system serving one or more districts in an area. The company is working with schools in projects in Minnesota, Arizona, and other states and has supported the annual Montana Distance Learning Conference. The company maintains a foundation to fund research and development activities in the field. Education representatives are in four of the five states in the region:

Idaho:	Phil Ruebel	208/385-8668
Montana:	Michele Burchett	406/441-7603
Oregon:	Tom Atkinson	503/484-7946
Washington:	Ezra Robinson	206/345-3862

Tele-Communications Inc. (TCI)

TCI cable systems provide free cable installation, programming, teacher support materials, and central location wiring to all participating accredited schools within TCI service areas. Recently, TCI announced a commitment to provide all public and private K-12 schools, located in its service area, a free Basic Educational Connection to the information superhighway. Initially the package will consist of a broadband connection to advanced coaxial/fiber networks being built by the company. Schools will be provided the basic connection to access Internet. The corporation is also sponsoring a Showcase Laboratory School in West Linn, Oregon and has supported the Montana state network.

The regional office and contact person for education is:

Ms. Cindy Eichner
TCI West
2233 112th Ave. N.E.
Bellevue, WA 98004 Phone: 1-206/462-2791

State or local company contacts may be obtained from Ms. Eichner.

Regional Telecommunications

NorthWestNet

NorthWestNet is a not-for-profit consortium that deploys and operates a regional computing and digital communications network serving the six states of Alaska, Idaho, Montana, North Dakota, Oregon, and Washington. NorthWestNet is a regional component of the National Science Foundation Network (NSFNET) and the worldwide Internet serving universities, colleges, primary and secondary educational institutions, libraries, government laboratories and research facilities, state and local government agencies, not-for-profit organizations, and industry. NorthWestNet is funded by member dues, service fees, and National Science Foundation grants.

NorthWestNet provides as services to its members a Network Operations Center, turn-key installation service, technical consulting services, network equipment and software maintenance service, training program and materials, online and published documentation (*The Internet Passport*); the *NodeNews* quarterly newsletter; Domain Name Service; Usenet news feeds; shared access to licensed, for-fee information services; network host services (e-mail, telnet, ftp, WAIS, gopher, etc.); conferences and sponsored seminars; and grants and contracts administration.

NorthWestNet is operated as a not-for-profit consortium owned and governed by its members. Each NorthWestNet member site is invited to participate in this effort through representative committees and advisory boards focusing on three areas of service: administrative, technical, and user services. This focus upon community involvement and governance allows NorthWestNet to achieve its mission of promoting research, education, and economic development in the Northwest through shared technology and information resources.

NorthWestNet
15400 SE 30th Place, Suite 202
Bellevue, WA 98007

Phone: 206/562-3000
FAX: 206/ 562-4822
E-mail: info@nwnet.net

INFORMATION RESOURCES

Programs and Production References

The following subscription publications may be useful to educators in the process of selecting instructional opportunities for students and inservice opportunities for teachers through distance education systems. All three provide information on programs, courses, time schedules, and access. They differ in coverage and frequency of issue. The first one addresses several distance education systems including nontelevision options while the second and third deal only with satellite-delivered television options.

At A Distance
Virginia A. Ostendorf, Inc.
P. O. Box 2896
Littleton, CO 80161-2896
$50 per issue, two issues per year.

Satellite Learning Program and Resource Guide
EnterACT Corporation
P. O. Box 409
League City, TX 77574-0409
$87 per year, Spring, Summer, Fall and Winter issues.

Satellite Scholar
The Comprehensive Guide to Distance Learning
2347 South Avenue West
Missoula, MT 59801

$89 per year, issued monthly with expanded preplanning issues; phone 1-800/488-7883 for a free sample issue.

The following publication is distributed free of cost to schools by many cable companies, although it can also be obtained by subscription if necessary from the address below. It is published monthly during the school year and contains schedule information organized by subject for the full range of educational programming from over 20 *Cable in the Classroom* member channels. The magazine also contains a taping calendar, articles, and instructional planning aids.

Cable in the Classroom Magazine
80 Elm Street
Peterborough, NH 03458 Phone: 603/924-0100
$18.00 per year, or free from cable company

General Information References

The following publications offer information on the range of delivery options, school district plans and examples, issues, problems, and future developments.

The American Journal of Distance Education
The Pennsylvania State University
403 South Allen St., Suite 206
University Park, PA 16801-5202 Phone: 814/863-3764
$15.00 each issue with subscription
$30.00 each issue without subscription

ED (Education at a Distance Journal
USDLA
P.O. Box 5129
San Ramon, CA 94583 Phone: 405/743-0320

Interactive Television for Distance Learning: From Plan to Practice
National School Boards Association's Institute for the Transfer of Technology to Education
P.O. Box 630422
Baltimore, MD 21263-0422
1-4 Copies, $12.00 each

Barker, Bruce O. *The Distance Education Handbook: An Administrators Guide for Rural and Remote Schools*
ERIC Clearinghouse on Rural Education and Small Schools
AEL
P.O. Box 1348
Charleston, WV 25325
$10.00 each

Meetings and Conferences

A great deal of general and specific information including progress reports and school district experiences is available at conferences and association meetings. The following list is intended to indicate the opportunities in the Northwest region. Information on dates and costs may be obtained from the responsible organization or state technology representative.

ACPE–Association for Computer Professionals in Education

Meets semi-annually in November and April, in major cities between Eugene and Seattle. Meetings are one day and focus on a specific predetermined topic, usually with an emphasis on administrative applications in education. Telecommunications and networking are often on the agenda.

Al Huff
Washington State Information
Processing Cooperative
20000 Cypress Way
Alderwood Manor, WA 98036

Phone: 206/775-8471, ext. 4200

ASTE–Alaska Society for Technology in Education

Meets annually for two or three days in April in Anchorage. Sessions cover a wide range of topics on the instructional use of computers, telecommunications, and related technologies.

Lois Stiegemeier
Alaska Department of Education
801 W. 10th Street, Suite 200
Juneau, AK 99801-1894

Phone: 907/465-8724

Montana Distance Learning Conference

Conducted annually for two days in March, at locations in Montana. The conference is sponsored by the EDUNET organization and the Montana Office of Public Instruction, with the additional support of other companies and agencies in the region. The sessions deal with various aspects of distance education and telecommunications in instruction.

EDUNET
P.O. Box 9121
Helena, MT 59604

Phone: 406/527-3531

NCCE–Northwest Council for Computers in Education

Conference conducted annually for three days in February, at various sites in Oregon and Washington. Sessions and workshops focus on instructional applications of computers and related devices, and on computer-based telecommunications.

Rick Morine
NCCE
2501 S.W. Sunset Boulevard
Portland, OR 97201-1219

NorthWestNet

An annual meeting, which is also open to nonmembers, is conducted in the region in the Fall. The meeting has sessions relevant to K-12 schools as well as universities, and the content has a heavy emphasis on the use of the Internet for broadband telecommunications in instruction at several levels.

NorthWestNet
15400 S.E. 30th Place, Suite 202
Bellevue, WA 98007

Phone: 206/562-3000
FAX: 206/562-4822
E-mail: info@nwnet.net

Curricular Cross-reference

For assistance in planning the role of distance education and telecommunications options in the curriculum, this list groups the various service options according to whether they purport to offer complete instruction as in a full course, or material and activities which are intended to be supplementary to the regular curriculum, enriching or extending the experiences of students.

Full Courses or Inservice

Course Name	Page
ACS	14
ASTS	2
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ESP	3
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MCET	4
Mind Extension University (Cable in the Classroom)	13
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Instructional Supplements

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APPENDIX

PLANNING AND DECISION MAKING

As in any instructional program in a school district, a decision to use distance education has implications for a number of areas of concern to administrators and teachers, described briefly here.

Staff

In all distance education programs, the student is separated from the primary instructor, which usually generates a need for some attention from staff at the student's location. Consideration should be given to the following areas.

Tasks—a staff member, either a professional or an aide, should be responsible for the direct supervision of students. The person is usually identified as a facilitator or monitor. When an aide is used, a certified staff member is sometimes identified as responsible for grading and credit. Some states have laws or administrative rules which require teacher certification or a special training course for aides. Some providers of distance education courses prescribe the role of a facilitator for a receiving site in their system. The following task areas are common to most situations.

Prepare equipment and supplies
Perform recordkeeping
Maintain discipline
Provide feedback to the instructor
Serve as liaison with the delivering agency
Monitor homework
Administer tests
Provide understanding and support to students

Time—Even though not involved in presenting information, the local staff members need time to carry out the local tasks. Also, in the satellite courses, the originating teacher conducts television sessions three or four days each week, leaving one or two days for specified local activities for which some preparation may be needed.

Training—Two types of training should be considered. First, the facilitator should receive training for the tasks of the position, usually provided by the distance education delivery agency either on site or by telecommunications. Second, the success of a distance program also depends on the support and good will of the rest of the teachers in the receiving school. An inservice program to educate the staff about the nature of the distance program and its implications for students and staff is an important component of preparation to achieve that support.

Environment

Several components of the receiving site need attention.

Space—Adequate room is needed for the number of students and equipment involved, with controllable light for desk work and television viewing.

Power—Enough electrical outlets are needed for the devices required for a receiving station, which might include TV, VCR, computer, printer, FAX, etc.

Telecommunications—In most systems, a direct phone line is required which does not pass through a switchboard where a call may be interrupted by an operator or other voice user. The ability to run cable to the room from an outside antenna is needed in television systems.

Back-up—To assure a cohesive instructional session with minimum interruption, it is important to identify back-up units in nearby rooms for the various technical components which could fail, including TV, computer, VCR, etc. Back-up videotapes and computer software should also be on hand.

Security—Depending on the climate and experience in a specific school, some consideration might be given to providing a locked space for containing the equipment when not in use.

Noise—The sound from television programming, like that of films, could be a problem for other nearby instructional spaces. Also, in some systems, students will be talking on the phone. The same consideration for noise should be given as in a regular classroom.

Support

Depending on the type of system in use, there may be other considerations for which advance planning and budgeting is important.

Maintenance—Computers and printers need occasional maintenance attention, and so do television monitors and other video equipment, although usually not as often. Identifying the closest local option and providing a budget to cover problems will reduce the potential down time in case of component failure.

Supplies—Printer paper, videotapes, and other supplies may be needed for the room. In some cases, instructional materials need to be purchased. If a variety of services are expected to be used, a subscription to a suitable program guide could be useful.

Travel—Some distance delivery organizations provide options for remote students to be part of a studio class. Part of the training of facilitators sometimes takes place in the

originating site. Conferences are available to enrich staff understanding. Consideration should be given to a budget to take advantage of such opportunities.

Budget

As is evident from the system descriptions in previous sections, a wide variety of fee structures is employed by the vendors of distance education courses and services. Some charge for items which others do not, and some have memberships while others do not. It is difficult to compare two systems which offer the same course or similar service but have different fee structures without working out an actual example of each. Some organizations such as Ed-Net in Oregon require a commitment for longer than a year.

The form on the next page is provided as a guide for obtaining a general total of costs from a single service, so that the net result of applying two different fee structures can be compared. It is designed to be generally applicable to a range of different options, and, therefore, might contain some items which don't apply in some cases. It is also designed to be a reminder of some factors which result in costs to the district but which are not typically included in vendor fee structures, so that the total cost of a plan is revealed.

The cost of some items such as phone lines and staff vary from one locale to another, even within a state, and will have to be obtained locally. We are unable to provide accurate figures for the region as a whole. The reader may find it necessary to add items to the form to suit local conditions and factors.

Distance Education
Cost Planning Worksheet

Delivering Organization:_____

Membership Fee $_____

Course Fees:

Title 1 _____ _____ Stu. x $_____ = _____

Title 2 _____ _____ Stu. x _____ = _____

Title 3 _____ _____ Stu. x _____ = _____

Inservice Courses _____ Teachers x _____ = _____

Instructional Materials: Purchase and duplication _____

Equipment:

Satellite Antenna _____

Satellite Tuner _____

Classroom TV, VCR, etc. _____

Computer, peripherals and software
(some courses may require several) _____

Phone Line:

Installation _____

Monthly Line Charge _____

Long Distance Charges _____

Maintenance and Replacement _____

Facilitator/Monitor _____

Travel, Conference _____

TOTAL $_____

EVALUATION

Educators planning to use distance education as a part of the school curriculum are faced with choices among delivery systems and among courses in the same subject from different systems. In some states, policy in law or administrative rules requires local districts to evaluate courses prior to selection or during use. Also, teachers and other district staff may be involved in the development of instruction to be delivered by distance technologies.

The guidelines in this document are intended to support all of those purposes. They have been assembled by the Technology and Rural Education Programs of the Northwest Regional Educational Laboratory from a number of documents which present instructional design and evaluation criteria, and from their on-site assessment of the effectiveness of selected courses from the EDUNET and STEP distance education systems in the northwest region. These guidelines are a starting point, and will be reviewed periodically to incorporate modifications occasioned by use and research. References for further information are available from the Technology Program.

Objectives

Learning objectives are expressed which:

- are clearly stated in terms of learner outcomes (knowledge, skills, attitudes)
- include higher-order thinking skills and the affective domain
- are written from the student's point of view
- have a consistent scope (are relatively equal in amount of material or work to cover)
- imply or state an appropriate level of difficulty
- are written with a performance measure in mind

Content

Concepts are organized in a logical manner.

Content is comparable to that of a traditional classroom course.

The information is developmentally appropriate for age or grade.

The information is current and accurate.

Content corresponds to the objectives established.

The scope is appropriate, and the coverage is comprehensive within those bounds.

Content is free-standing, requiring little if any outside resources or information.

Instructional Design

Teaching strategies include all modalities: Visual, auditory, tactile.

Strategies reflect effective teaching research: frequent review, guided practice, extensions (enrichment), and correctives (reteaching).

Attention is given to learning styles of the target age group.

Lesson or unit size is appropriate for self-directed learning.

Lessons or units are arranged in a logical sequence.

A suggested pace of progress appropriate to the target audience is included.

Optional learning activities are included for use after criterion test failure or at other appropriate points.

Learner interaction with content is encouraged.

- Challenging questions are posed
- Written assignments are required
- Critical viewing, reading, and thinking are stimulated

Instructional Materials

Materials are selected to address different learning modalities: visual, auditory, and tactile.

A variety of instructional materials are used: print, computer software, audiotape, videotape.

The purpose of the materials and their relation to objectives are clear.

Materials are identified or provided to support options for enrichment and remediation.

Materials are identified or provided to support frequent review and guided practice.

Print materials have an appropriate vocabulary and reading level.

Recommended and provided materials are consistent with state and local standards and selections.

Evaluation

Formative tests are administered frequently.

Summative tests are presented at appropriate points.

Tests are related to instructional objectives.

Practice tests for self-assessment are available in paper form.

Grading standards are clear and fair.

Facilitator Guidelines

A set of guidelines are provided which will assist the school course facilitator in providing effective student support and guidance. The following items should be included:

- Responsibilities of the facilitator
- Learning objectives
- Content outline for the entire course or unit
- Prerequisites expected of students
- Expectations for pacing and completion time
- Optional instructional approaches, materials and activities
- Teacher contact information, including times available
- Grading approach, philosophy, and local options
- Special requirements for equipment and facilities

GLOSSARY OF TERMS

ASCII—A standard code for the transmission of alphabetic, numeric, and other characters in computers and telecommunications systems. (American Standard Code for Information Interchange)

Amplifier—A device used in telecommunications systems to restore to its original level a signal which has deteriorated over a distance.

Antenna—In a satellite system, the receiving antenna is a disk shaped with a parabolic curve. A standard antenna for C-band has a diameter of about three meters, and a Ku band signal requires a diameter of one to two meters.

Audiographic—A system which transmits both an audio signal and computer graphics on the same telephone cable. Equipment includes a computer, graphics tablet, and speaker-phone at delivering and receiving ends, and some additional communications devices. A television signal is not part of the system.

Band Width—The size of a telecommunications band in cycles or bits per second which defines the capacity of a medium such as copper wire or fiber optic cable to carry signals. The larger the band width, the greater the number of signals which can be transmitted simultaneously, or the greater the amount of information which can be sent at one time. Video signals require greater band width than audio because there is more information in a picture.

Baud—Baudot code, a scale for expressing the rate of transmission of information in defined sets. For example, 1200 baud is 1200 bits per second, where one bit is one set of information.

Bit—One binary digit, expressed numerically as a 0 or 1, or as a brief change in signal intensity on a telecommunications line.

C-Band—A band of telecommunications frequencies reserved for satellite transmission (3700-4200 MHz from satellite to earth). This band requires a larger receiving dish antenna than Ku band, is less prone to signal loss in rain or snow, and is more prone to microwave interference.

Channel—A basic unit of service in a telecommunications system, usually a narrow bandwidth such as 6 MHz for a television channel.

Coaxial—A cable having a copper-clad aluminum core with insulation to minimize loss of signal and interference. It can handle higher frequencies for longer distances than twisted pair.

Codec—Coder-decoder, a device for changing a video signal from analog to digital or the reverse, as the signal passes between a transmission device and cable or other medium. The purpose is similar to that of a modem in an audio signal.

Converter—A device that translates nonstandard frequencies between channels 6 and 7 and above channel 13 to an unused VHF channel, extending the channel capacity of a cable system.

Direct Broadcast Satellite (DBS)—A satellite equipped to transmit a strong signal in a concentrated beam, which enables a school or other location to receive signals with a relatively small dish antenna.

Downlink—A receiving station for a satellite signal, usually a parabolic dish antenna and other equipment to carry the signal to a television set.

Downstream—Cable signals traveling from the headend to the subscriber or receiving site.

Fiber Optic—A type of cable made of many glass fibers, each of which carries a signal generated by a light source such as a laser. The light flashes on and off, creating a combination of bits. It has much greater capacity than coaxial or twisted pair.

Footprint—The area on earth within range of a satellite-transmitted signal.

Headend—The master control center of a cable system, which distributes the signals from the satellite antenna or other source to the cable users.

Ku Band—A band of telecommunications frequencies reserved for satellite transmission (11700-12200 MHz from satellite to earth). This band requires a smaller dish antenna than C-band, is more prone to signal loss from rain or snow, and is less prone to terrestrial microwave interference.

MHz—Megahertz. Hertz (Hz) is the name of a unit of measure of a signal in cycles or waves per second. One MHz is one million waves per second. One GHz is one billion waves per second. A human ear typically operates in the range from about 16 Hz to 16 Kilohertz (KHz), or 16 to 16,000 waves per second.

Modem—Modulator-demodulator, a device used to change a computer-generated signal to an audio signal which can be carried on a telephone line, or the reverse.

MSO—Multiple System Operator, a company or organization owning several cable delivery systems.

Narrowcasting—Television programming designed for a specific target audience.

Polarization—A technique to increase the capacity of satellite transmitters. In linear polarization, half the signals are generated horizontally and half vertically, with no interference resulting.

Slow Scan—A form of television in which an image is scanned and transmitted only once every minute or so instead of many times a second as in a regular television broadcast. The receiver sees an image change slowly, as in viewing a series of slides. The advantage is that the signal can be transmitted inexpensively over telephone lines.

Teletext—Distribution of textual data by broadcast television, in the vertical blanking interval.

Transponder—The receiver/transmitter combination within a satellite, which receives the signal from an uplink, amplifies it, and retransmits it to a downlink. There are many transponders in one satellite, each representing one video channel.

Tuner—Part of the receiving apparatus in a downlink site to focus on the signal.

Twisted Pair—The term used to describe the common telephone cable, composed of two copper wires twisted to form a cable for one phone line, with many pairs combined in a large cable to serve more phones.

Uplink—A station for transmitting a signal to a satellite, sometimes called an earth station. It includes a parabolic dish antenna and other related equipment.

Upstream—Cable signals traveling from a subscriber site to the headend.

Vertical Blanking Interval—A portion of a standard broadcast band or channel, which is unused by the television signal, and available to carry other information.

Videotex—Distribution of textual data by a cable system.

VSAT—Very Small Aperture Terminal, a receiving antenna of about one meter in diameter.